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PROCEEDINGS OF THE
ROYAL ENTOMOLOGICAL SOCIETY
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SERIES A. GENERAL ENTOMOLOGY

VOLUME 21. 1946.

WHAT IS THE PRESENT STATUS OF *VOLUCELLA ZONARIA* PODA (DIPT., SYRPHIDAE) IN BRITAIN?

By B. M. HOBBY, M.A., D.Phil., F.R.E.S.

THIS handsome fly was included among reputed British species by Verrall (1901, *British Flies* **8** : 671) on the basis of two specimens in the old Entomological Club collection although there is now reason to suppose that these insects were originally taken in Jersey. Capt. E. R. Goffe (1945, *Ent. mon. Mag.* **81** : 159–62) reviews the thirteen published records of its occurrence in Britain and shows that at the time of writing (February, 1945) there were six authentic British specimens in collections, three reputed British, but without date of capture, and one taken off the Kentish coast. Mr. C. J. Wainwright (1944, *Ent. mon. Mag.* **80** : 225–6) considered that " the few occurrences known certainly give no impression of a resident species, and it is such a large, fine and striking insect that it could not be overlooked. It is almost certainly a rare chance vagrant." As Goffe points out, published records are confined, with but one exception, to the coastal counties of Kent, Sussex, Hampshire and Dorset and suggest its introduction to Britain may have been by migration from France. On the other hand, specimens were seen or captured at Folkestone, Kent, in both 1941 and 1943, which suggests that it may have bred in this area for at least three consecutive seasons, while captures at Dorchester (1940), Weymouth (1941) and Bristol (1943) " suggest a second establishment and extension covering at least four seasons."

Recently Lt.-Col. F. C. Fraser (1945, *Ent. mon. Mag.* **81** : 237–8) reported at least eight specimens seen or captured in Bournemouth, Hants, during August that year, together with circumstantial evidence that the species may be breeding in a nest of *Vespula vulgaris* L.

Finally Mr. B. B. Osmaston took two specimens on ivy blossom at Westgate-on-Sea, E. Kent, on 7th October, 1945, and four females on the same patch of flowers two days later. In presenting the latter insects to the Hope Department of Entomology, Oxford University Museum, he stated that he captured them in his hand and could have secured many more had he known their rarity. He also commented upon its hornet-like coloration. Mr. Osmaston's specimens were killed with ammonia and are a much deeper colour than the smaller *V. inanis* L. with which it has sometimes been confused.

These recent occurrences, on a more generous scale than hitherto, support the view that the insect may now have succeeded in establishing itself here.

Since the above was written Capt. E. R. Goffe informs me that he has been notified of two further specimens captured by Mr. P. A. H. Muschamp, the first in Gloucestershire in 1928 and the second in Devon in 1936, while others were taken this year by Mr. G. Waller in the Folkestone district, Kent. Mr. C. J. Wainwright (*in litt.*, 3.xii.45) reports one at Wick, near Christchurch, Hants, on 18th June, 1945, and suggests the possibility that autumnal specimens may be descendants of early immigrants. On 24th November, 1945, Lt.-Col. F. C. Fraser opened up the wasps' nest where the *Volucella* had been seen resting earlier in the year and discovered seventeen large larvae for which the most probable determination is *V. zonaria*. At the meeting of the Royal Entomological Society of London on 5th December, 1945, Mr. A. J. A. Woodcock exhibited four specimens of *V. zonaria* taken in East Kent and stated that he had found it with unfailing regularity every year since 1938. This additional evidence strengthens the claim of the fly to be an established British species.

A FURTHER INSTANCE OF "ANTING" BY A STARLING

By B. M. Hobby, M.A., D.Phil., F.R.E.S.

While taking tea in a garden at Kennington, Berks, at 4.15 p.m. (B.S.T.) on 26th August, 1945, my wife directed my attention to a group of three starlings hopping about on the lawn. Two were apparently feeding normally, but the third repeatedly pecked at the turf and then vigorously rubbed its beak, presumably holding an object, beneath the base of the wings. The bird seemed much engrossed in this performance, but when I approached nearer in an attempt to obtain a better view the two birds engaged in feeding flew off and the third followed them.

I immediately examined the ground vacated by the birds and found a number of workers and winged ants crawling about, also a single dead worker of the same species, *Acanthomyops mixtus* Nyl. The dead ant was in a relaxed condition, covered with fluid, and had the abdomen somewhat battered; it had most probably just been abandoned after being used by the starling.

The problem of "anting" in birds is discussed by Prof. G. D. H. Carpenter (1945, *Proc. R. ent. Soc. Lond.* (C) **10** : 13–14, 22), to whom I am indebted for referring me to yet another published example of this strange habit. It occurs in Butler (1910, *Trans. ent. Soc. Lond.* **1910** : 154), who says : "In the case of *Dryonastes* (Jay-Thrushes) the wasp is seized and its tail rubbed backwards and forwards between the tail-feathers of the bird, in order to break the sting or exhaust its venom before it is eaten." This interpretation of the behaviour should be rejected as unlikely, though its real meaning is far from evident.

I am indebted to Mr. H. Donisthorpe for kindly confirming my identification of the ant, a species neither as abundant nor as widely distributed as the closely related *A. umbratus* Nyl. It is unrecorded from Berkshire in Donisthorpe (1927, *British Ants*, Lond., 2nd ed. : 278) although it has twice been taken just over the county boundary in Oxfordshire.

EFFECT OF ATMOSPHERIC HUMIDITY ON THE EGGS OF A PHASMID *CARAUSIUS* (*DIXIPPUS*) *MOROSUS* BR.

By Jean Leclercq, F.R.E.S.

(*Université de Liége.*)

In these experiments, 175 eggs were used. They were laid between 11th September and 10th November, 1943, by three females from the same culture and fed on leaves of *Hedera helix* L. Immediately after laying, the eggs were placed in incubator tubes. The relative humidity in these tubes was controlled by a series of supersaturated solutions of different salts. Seven humidities were chosen : 100%, 95%, 87%, 78%, 50%, 25%, and 7%. The conditioned tubes were kept in a room at a temperature between 15 and 21° C.

Effect on Vitality.

The eggs of *Carausius morosus* survive and produce nymphs at all the tested humidities. But under 30% R.H. an average of 20–25% of the young nymphs cannot survive after hatching and often die without escaping completely from the eggshell (fig. 1). This is an effect of dryness on the emerging young only, because all embryos develop up to the first stage. It seems, therefore, that these deaths are the result of dehydration of the newly formed first nymphs. Similar results have been recorded by H. H. P. Séverin and H. C. Séverin (1910) for another Phasmid, *Diapheromera femorata* Say. In this case, the percentage checked and dying during hatching was higher, *i.e.*, 94%.

Effect on Duration of Incubation Period.

The first hatchings occurred on 24th December, 1943, the last on 13th March, 1944. The development is quicker at the higher humidities. In saturated air, hatching requires an average of 104 days and it is in this condition that I have recorded the minimum incubation time of 96 days. At 7% R.H., hatching requires an average of 120 days and here I have recorded the maximum incubation time of 162 days. Table 1 gives details of these results :—

Table 1.

Effect of relative humidity on duration of incubation period of the eggs of *Carausius morosus* (temperature between 15 and 21° C.).

Relative Humidity	Average duration of incubation period	Standard error
100%	104 days	±2·5 days
95%	109 ,,	±3 ,,
87%	110 ,,	±3 ,,
78%	112 ,,	±2 ,,
50%	114 ,,	±2·5 ,,
25%	116 ,,	±2 ,,
7%	120 ,,	±3 ,,

CONCLUSIONS.

Under the condition of temperature used in my experiments (*i.e.*, 15–21° C.), eggs of *Carausius morosus* appear to be able to survive and produce nymphs at all humidities between 7 and 100%. High humidities, particularly those approaching saturation, however, accelerate incubation and favour the survival of the hatched nymphs.

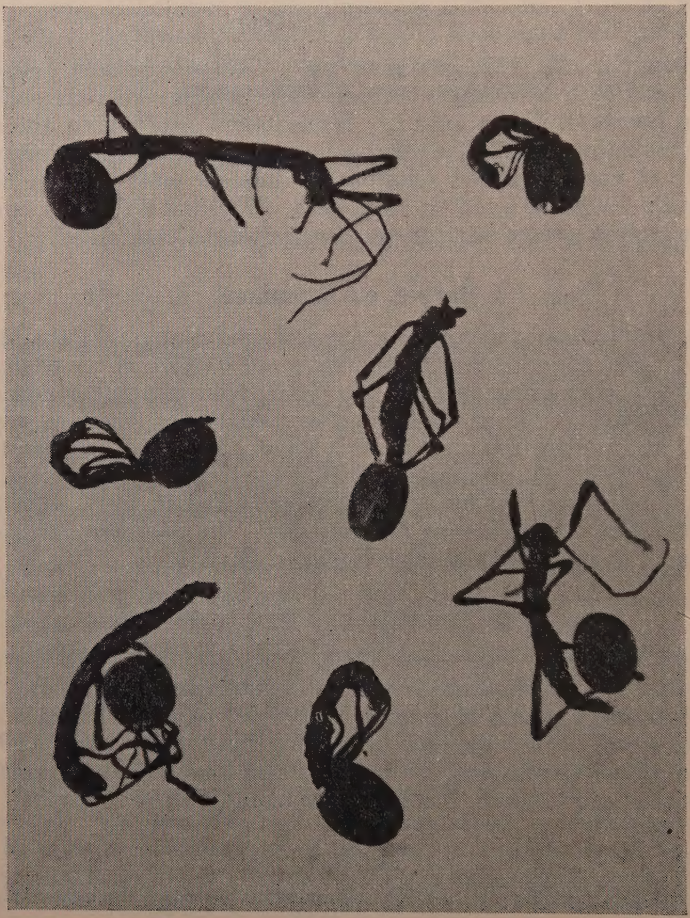

FIG. 1.—First nymphs of *Carausius morosus* dead during hatching after incubation in dry conditions (Phot. L. Max).

Eggs of Orthoptera are known to be able to develop over a wide range of humidities, but not so wide as the eggs of *Carausius*. For example, eggs of *Schistocerca gregaria* (Bodenheimer, 1929), of *Melanoplus mexicanus* and *Camnula pellucida* (Parker, 1930) fail to develop under 40% R.H. at optimal temperatures and the threshold became still higher at temperatures above the optimum.

ACKNOWLEDGEMENTS.

I wish to thank Prof. Z. M. Bacq and Prof. D. Damas, in whose Departments at the University of Liége this work was carried out. I am indebted to Dr. K. Mellanby of the London School of Hygiene and Tropical Medicine for kind help and advice in the writing of this paper.

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PARKER, J. R., 1930, Some effects of temperature and moisture upon *Melanoplus mexicanus* Saussure and *Camnula pellucida* Scudder. *Bull. Univ. Montana agric. Exper. Sta.* **223**.

SÉVERIN, H. H. P., and SÉVERIN, H. C., 1910, The effect of moisture and dryness on the emergence from the egg of the walking-stick, *Diapheromera femorata* Say. *J. econ. Ent.* **3** : 479.

BOOK NOTICE.

Common Insects of Hawaii. By D. J. FULLAWAY and N. L. H. KRAUSS. Pp. 228, 12 pls. col., 16 text-figs. 8vo. Honolulu (Tongg Publishing Co.). 1945. Price $3.50.

In a census of Hawaian insects published in 1932, and reproduced in this book, the number of species is estimated at 4620, of which 3754 are endemic, 53 (43 in error on p. 9) indigenous and 813 introduced.

This very large total precludes the inclusion of all the species in a small volume and is the reason why this attractive book is " not another Fauna Hawaiiensis, but rather a cross-section of the lowland fauna."

The ten chapters deal with : " Insects and their relatives ; the smaller orders ; the cockroaches, crickets and grasshoppers ; the true bugs ; the leaf-hoppers, aphids and scales ; the beetles ; the moths and butterflies ; the true flies ; the bees, wasps and ants ; and insect relatives."

Indices to authors, collectors, insects and plants are provided.

Since all the insects included in the book are illustrated in colour the descriptions are kept short and the text is throughout written in readable form.

Book Notice.

Bibliography of the Homoptera Auchenorhyncha. By Z. P. Metcalf (State College of Agriculture and Engineering of the University of North Carolina). $7.50. Vol. 1, pp. 886; Vol. 2, pp. 186. [n.d.]

The Homoptera Auchenorhyncha, which comprise Cicadas, Fulgorids, Cercopids, Jassids, and Membracids is a group of insects of great interest and antiquity, and includes several species of considerable economic importance.

This Bibliography of the literature of the group is divided into two parts. In the first volume are listed all the titles of works dealing with the Auchenorhyncha published up to 1st June, 1942. The second volume is divided into three parts, commencing with a list of periodicals, followed by an Appendix consisting of a list of those papers which have come to the author's notice since the completion of vol. 1, and including titles of a few papers published in 1943. The final section is a Topical Index commencing with a classified index devoted to such subjects as morphology, physiology, and economic entomology. This is followed by a Taxonomic part indexed under superfamilies, families, and subfamilies, and lastly a section in which references to papers are given under geographical sub-headings.

In the introduction, Professor Metcalf mentions that although the Order Homoptera comprises a relatively small number of species, more than 8000 titles have been devoted to them, and that these are contained in more than 1000 separate journals and 900 books. It will thus be appreciated that the preparation of this Bibliography has been a formidable task, and it is quite certain that all Homopterists will be grateful to the author for having undertaken it, and for the endurance he has shown in bringing it to completion.

As pointed out by the author, it is not always easy to determine whether certain borderline papers should be included in a Bibliography of this nature. Professor Metcalf has adopted a liberal attitude in exercising his discrimination.

In the first volume, following the majority of the references, brief notes are given which indicate the contents of the papers indexed. These notes vary in their scope and are far from consistent. As they are of considerable use it is felt that some slight expansion, accompanied by greater consistency, would have added to the value of the volume without entailing any significant increase in its size.

The Topical Index is open to criticism in several directions, but bearing in mind that criticism is easy, while the preparation of such an index is beset with pitfalls, one can only congratulate Professor Metcalf on his boldness in attempting such a task, and for his success in producing an index which, if not free from faults, will most certainly prove of great service to all Homopterists.

No indication is given on the title-page of either volume as to the identity of the printers and publishers or the date of publication, but they are to be congratulated for producing, in war-time, volumes which are well-bound, of pleasing appearance, and with clear well-spaced type.

NOTES ON THE BIOLOGY OF SOME HYMENOPTEROUS PARASITES OF THE BEECH WEEVIL (*RHYNCHAENUS FAGI* L.) (COL.)

By Bryan P. Beirne, Ph.D., M.R.I.A., F.R.E.S.

The Beech Weevil, *Rhynchaenus* (*Orchestes*) *fagi* L., is found wherever Beech grows throughout the British Isles, but must have been artificially introduced into many regions, including Ireland, as its foodplant is indigenous only in southern and eastern England. Its life-cycle has been described briefly by Eckstein (1922), Oldham (1928) and Trägårdh (1910). The following are some notes on the biology of its parasites in Ireland. The material consisted of over 900 weevil larvae collected at Foxrock, Co. Dublin, in 1944, together with smaller collections from other parts of Co. Dublin and from Cos. Wicklow, Leix and Tipperary.

Of the Foxrock larvae only 22% produced adult weevils, 44% were parasitised by the Braconid (Hym.) *Triaspis pallidipes* Nees and 22% by the Braconid *Colastes braconius* Haliday while the remaining 12% died from other causes, more than half of them being killed apparently by a species of yeast. Both Braconids have been recorded previously as parasites of this weevil, but their life-histories do not appear to have been described. As the facial rods and mouth-parts of the larvae appear to be of considerable importance taxonomically (see Beirne, 1941) I have figured those of the different larvae found.

Triaspis (*Sigalphus*) *pallidipes* Nees is a common and often locally abundant species throughout the British Isles. Bukovskii (1933) concludes that *T.* (*S.*) *fagi* Retzius is a species distinct from *T.* (*S.*) *pallidipes* Nees and that the records for the latter as a parasite of *Rhynchaenus* should refer to the former. As a description of *T. fagi* was not available the name *pallidipes* is used here for the species, but I have given figures for the adult (figs. 1, 2 and 3) so that it may be possible to discover its true identity at some later date. The adults of both sexes are black in colour, with the legs, except for the coxae, yellowish-brown.

This Braconid is a solitary internal parasite of *Rhynchaenus fagi*. The eggs apparently are laid in the spring, while the weevil larva is feeding within its mine in the beech leaf (*i.e.* from early in April to the beginning of June). The eggs shown in fig. 4 were dissected from a female *Triaspis*. No early larvae of *Triaspis* were found, but the final-instar larvae and its mouth-parts, and a mandible of the penultimate-instar larva, are shown in figs. 6, 7 and 5, respectively. The parasite larva does not kill its host until the latter has spun its cocoon. When this cocoon has been formed the parasite larva consumes the remainder of the body-contents of its host and emerges from the skin to spin a strong oval cocoon, dark brown in colour and smooth on the outside (fig. 8), within the *Rhynchaenus* cocoon. The parasite cocoon is not attached to the inside of the host cocoon or to the leaf-surface, unlike that of *Colastes*. Pupation takes place usually at the end of May or beginning of June. The adult parasites emerge during the first half of June, the main hatching taking place a week or ten days before the main emergence of *Colastes*. 74% of the parasites bred were females. It would appear that the females are very retiring in their habits, as Mr. A. W. Stelfox, of the National Museum, Dublin,

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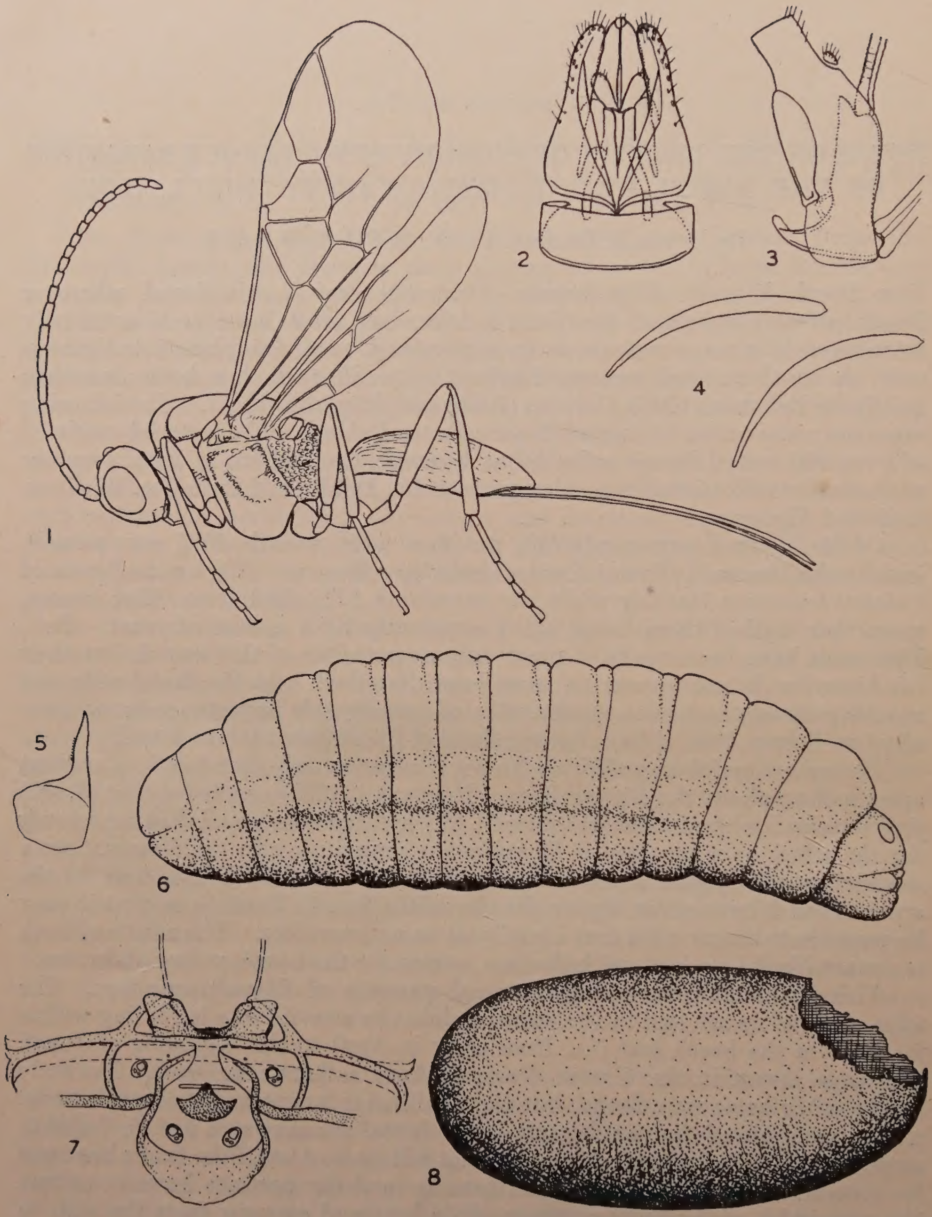
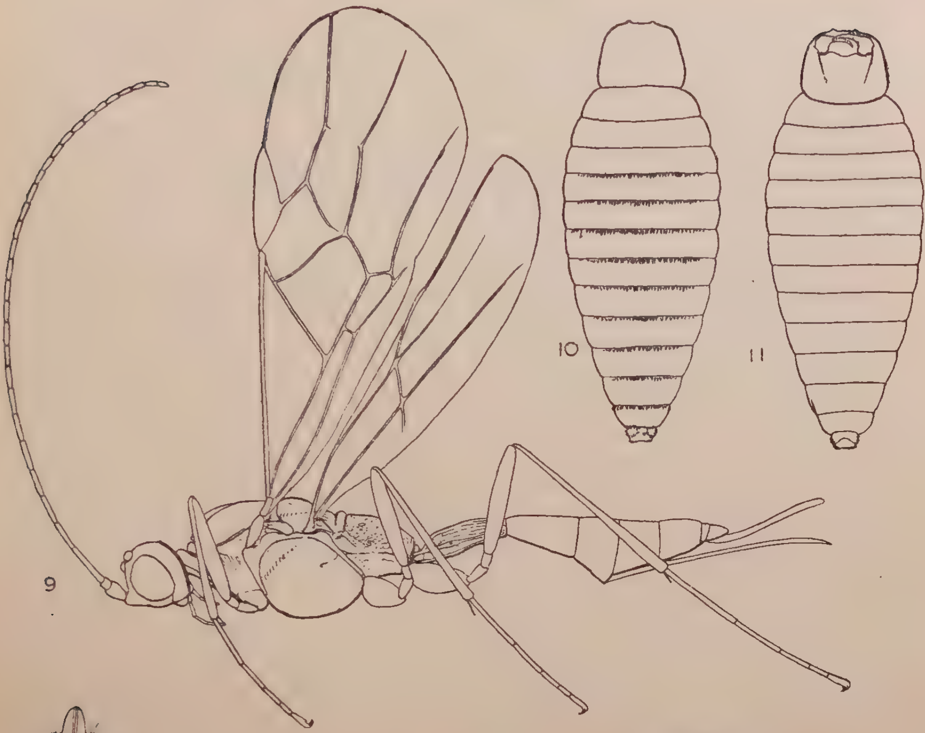
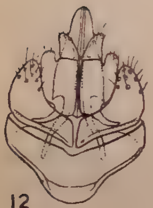


FIGS. 1–8.—*Triaspis pallidipes* Nees. 1. Adult female; 2. male genitalia, ventral view; 3. female genitalia, lateral view; 4. eggs; 5. mandible of penultimate-instar larva; 6. final-instar larva, lateral view; 7. facial rods and mouth-parts of final-instar larva; 8. cocoon. (Figures not to same scale.)

FIGS. 9–20.—*Colastes braconius* Haliday. 9. Female, lateral view; 10. first-instar larva, dorsal view; 11. first-instar larva, ventral view; 12. male genitalia, ventral view; 13. female genitalia, lateral view; 14. facial rods and mouth-parts of fifth-instar larva; 15. fourth-instar larva, lateral view; 16. facial rods and mouth-parts of third-instar larva; 17. facial rods and mouth-parts of fourth-instar larva; 18. egg; 19. parasitised *Rhynchaenus* larva; 20. fifth-instar larva, lateral view. (Figures not to same scale.)

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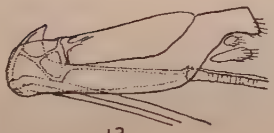
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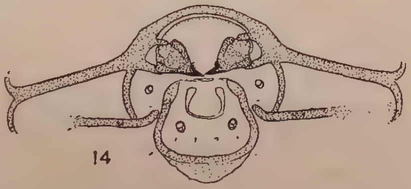
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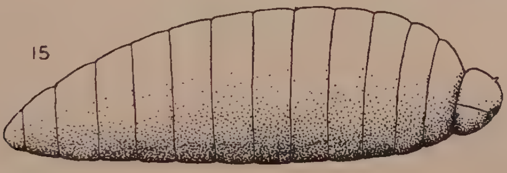
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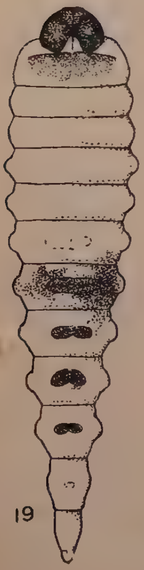
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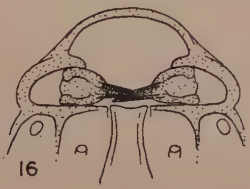
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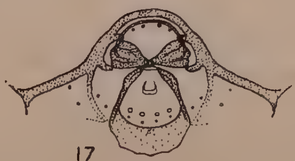
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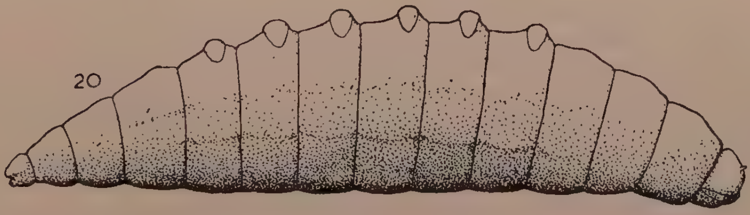
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to whom I am indebted for the identification of these Hymenoptera, informs me that the males may be captured commonly during June but that the females are relatively very scarce.

Rhynchaenus fagi is single-brooded, as apparently is *Triaspis*, for adults of the latter are on the wing only in June. It is not clear what happens to the parasite for the remainder of the year. Possibly the females conceal themselves from the end of June until the following spring, when they appear and lay their eggs.

Colastes braconius (figs. 9, 10 and 11) has been found commonly throughout the British Isles. It is a solitary internal parasite of *Rhynchaenus fagi*, the eggs (fig. 18) being laid in the body of the host larva during May, the female parasite inserting them under the skin by means of her long ovipositor. Parasite larvae of five instars were noted. The first-instar larva is shown in figs. 10 and 11. The second and third instar larvae are similar in appearance to larvae of the fourth instar (fig. 15). The facial rods and mouth-parts of the second-instar larva are similar to those of the third-instar larvae (fig. 16) in form but, except for the blades of the mandibles, are only feebly sclerotised and pigmented. The fourth-instar larva (figs. 15 and 17) attacks the vital organs of the host, eventually killing it. Parasitised host larvae are easily recognised as parts of the dorsal cuticle become darkened (fig. 19). This darkening appears to be due to a staining of the cuticle and the colour is not removed by boiling in a weak solution of caustic potash. Later other parts of the body become blackened, but here the blackening is due to the decomposition of the underlying tissues. Later-instar *Colastes* larvae may be distinguished from those of *Triaspis* by their pale greenish colour and by the body tapering evenly anteriorly and posteriorly (compare figs. 6 and 20).

The final-instar *Colastes* larva (figs. 14 and 20) consumes the remainder of the body-contents of the host, which by this time usually is full grown but has not commenced to spin its cocoon. The parasite larva then emerges from the skin and wanders about in the leaf-mine for a time before spinning its cocoon and pupating. The cocoon is composed of white silk and is cylindrical in shape, measuring about 4 mm. by 1·5 mm. It is attached above and below to the insides of the leaf surfaces. The adult parasite emerges through a round hole which it gnaws through the wall of the cocoon near one end and through the upper surface of the leaf. The sexes were bred in equal proportions. Adults of both sexes are black in colour with the apical half of the second abdominal segment, and usually all of the third and part of the fourth, and the basal segments of the antennae, yellowish-brown, while the mouth-parts and legs are pale yellowish. The species has been captured in most months of the year and it seems likely that there are several generations per annum, in different hosts. According to Marshall (1885), the species has been bred from a considerable number of species of leaf-mining Coleoptera, Diptera and Lepidoptera. There were considerable differences in the proportions of the weevil larvae attacked by this species in different localities in Ireland in 1944. These differences may be due to differences in the abundance of alternative hosts in the various localities. Adult *Colastes* vary considerably in size, perhaps as a result of differences in the sizes of their hosts. The adults were observed frequently feeding on drops of moisture on the beech leaves.

A third of the *Colastes* larvae from Foxrock were killed by a Chalcid (Hym.) hyperparasite which was not identified. Its larva kills the *Colastes* larva after the latter has left the body of its host and is wandering about in the mine or spinning its cocoon. The adult Chalcids, which are iridescent green in colour, were bred in the proportions of three females to one male. They emerged at the end of June and beginning of July, about a fortnight after the main emergence of *Colastes.*

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BOOK NOTICE.

Entomologisches Praktikum. Einführung in die land- und forstwirtschaftliche Insektenkunde. By O. SCHNEIDER-ORELLI. Pp. 149, 68 figs. Sm. 8vo. Aarau (H. R. Sauerländer & Co.), 1945.

This publication is issued with the imprint of the Entomological Institute of the Technical High School, Zürich, where the author has been engaged in teaching for many years.

The book is arranged in the following sections: an introduction dealing with structure, development, etc.; followed by a section on the systematic arrangement of insects; keys to the orders; a long section on morphology; one on biology and shorter sections on collecting and preserving insects, literature and technical terms; and is completed by an index.

Throughout the book emphasis is laid on clarity of explanation with close adherence to accuracy of statement.

The book is very well produced on excellent paper and with first-class illustrations in abundance.

A PLANT WITH STICKY SEEDS WHICH ATTRACTS AND TRAPS BUTTERFLIES (*ACRAEA*) IN TANGANYIKA

By Professor P. A. Buxton, M.A., F.R.S., F.R.E.S.

In July 1945 I found a plant (*Boerhaavia* sp. ?; N. O. Nyctaginaceae) rambling over a hedge of *Euphorbia* at Mpwapwa, Tanganyika. The plant had fragrant white flowers, attractive to butterflies of several types. The seeds, or rather the anthocarps, resembled drum-sticks, and were glandular and sticky towards the distal ends. The commonest butterfly visitor was a small *Acraea* (*A. terpsichore* L.). Many individuals of this butterfly were found stuck to the seeds on the plant, some of them still struggling, others dead. Several other small butterflies (Lycaenidae, Pieridae) were visiting the flowers, but none was seen entangled.

A piece of the plant (*Boerhaavia*), with dead *Acraea* stuck to it, has been deposited in the Hope Museum, Oxford University.

It is evident, I think, that this event is not similar to the trapping of insects by insectivorous plants, for they clearly gain by digesting and absorbing the insect. It should probably be regarded as purely accidental, and in that way similar to the trapping of insects by grasses with adhesive burr-like seeds (Williams, 1945, *Entomologist* **78**: 37–38; earlier records exist). Both the grasses and the *Boerhaavia* are plants which are likely to be distributed as seeds adhering to large animals; in this case the butterfly is not large enough to carry off the seed.

Book Notice.

Animal Cytology and Evolution. By M. J. D. White. Pp. viii + 375, 121 figs. 8vo. Cambridge (University Press), 1945. Price £1 16*s*.

This book deals with a special aspect of animal cytology, namely the evolution of the chromosomes, and the author suggests that he might have entitled it "The Evolution of Evolution" had that title not appeared to him ambiguous and pompous!

The chapters are fourteen as follows: introduction; structure of mitotic chromosomes; salivary-gland chromosomes; mechanism of structural rearrangements; meiosis; chromosomal evolution in wild populations; chromosomal evolution in the genus *Drosophila*; the evolution of chromosome numbers and chromosome form; the evolution of meiosis and the chromosome cycle; hybridisation and the causes of hybrid sterility; the evolution of the sex-determining mechanism; sex-determination by male haploidy; the evolution of parthenogenesis; conclusions. There is a very long bibliography of 37 pages, which must include more than 1600 titles, and indices to authors, organisms and subjects are given.

The author regrets the modern tendency to a division between specialists working on *Drosophila* and those working on other groups of organisms and hopes that his book will help to close up the cleavage.

Recent work has been taken into full consideration in writing the book, but of necessity work published during the war in enemy countries has not been available to the author.

ON A NEW PHASE CHARACTER, THE METASTERNAL INTERSPACE, IN THE DESERT LOCUST, *SCHISTOCERCA GREGARIA* (FORSKÅL) (ORTHOPTERA, ACRIDIDAE)

By M. L. Roonwal, M.Sc., Ph.D. (Cantab.).

(*Assistant Superintendent, Zoological Survey of India.*)

Structural differences in the thoracic sterna sometimes provide valuable differentiating characters in the Acrididae. Thus, Uvarov (1922 : 238–9) has utilised the mesosternal interspace to distinguish between two forms of the Rice Grasshopper *Hieroglyphus banian*, namely, *H. banian banian* Fabr. and *H. banian elongata* Uv. The same author (Uvarov, 1923 : 32) has employed both the meso- and metasternal characters to distinguish between two closely allied species of locusts, namely, the South American Locust *Schistocerca paranensis* Burm. and the Desert Locust *S. gregaria* Forsk., the metasternal differences being given as follows : " Metasternal lobes contiguous in males and narrowly separated in females of *paranensis*, while in *gregaria* they are distinctly separated in males and broadly so in females."

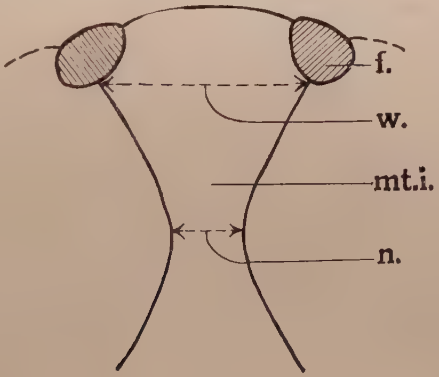
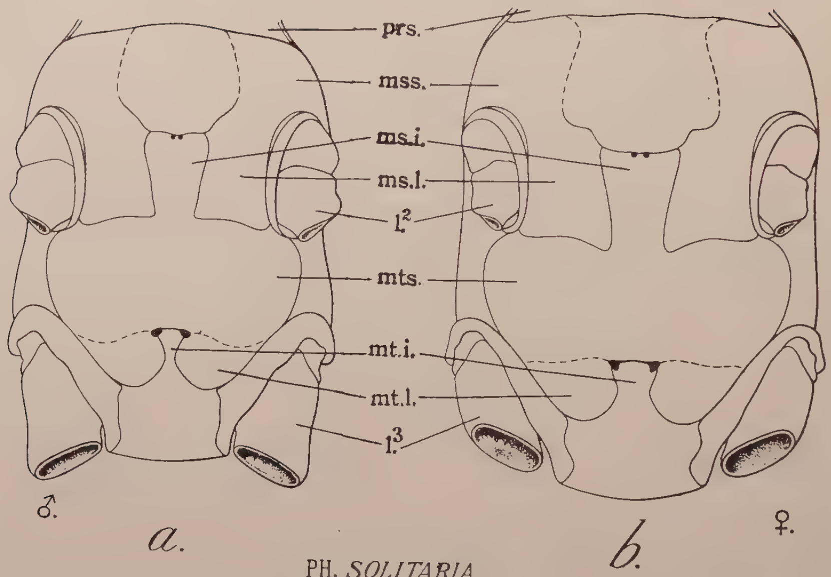


Fig. 1.—Enlarged diagrammatic view of a portion of the metasternal interspace of *Schistocerca gregaria* (Forskål), phase *solitaria* male (same as in fig. 1 a), to show the method of measurement of the broadest (anterior) and the narrowest width of the metasternal interspace.

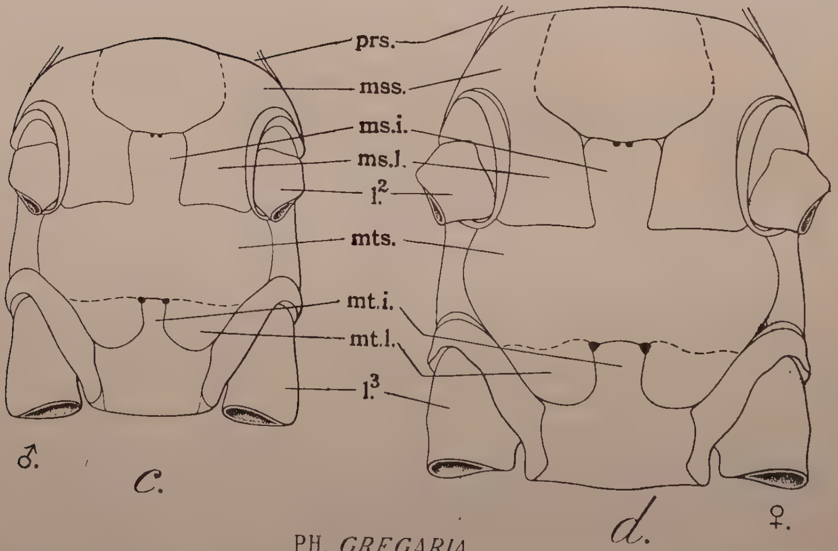
f., furcasternal pit; *mt.i.*, metasternal interspace; *n.*, narrowest width; *w.*, broadest width.

In distinguishing the two phases of *Schistocerca gregaria*, Uvarov (1923 : 33) has utilised the mesosternal character, but does not refer to the metasternum. In the same species, Karandikar (1939) has described the metasternal structure (of a *gregaria* individual, judging from his fig. 29), but no reference is made to phase differences in this respect. So far as I am aware, no author has referred to phase differences in the metasternum of the Desert Locust.

PROC. R. ENT. SOC. LOND. (A) 21. PTS. 1–3. (MARCH 1946.)



PH. *SOLITARIA*



PH. *GREGARIA*

FIG. 2 *a–d.*—Ventral views of the sternum of *Schistocerca gregaria* (Forskål), showing phase differences in the metasternum. × 4.

(*a*), (*b*). *Phase solitaria.*—(*a*) Male, Budha (W. India), 9.ii.1938; Z.S.I. No. 1182/H5; 7 eye-stripes; E/F 2·08; antennae broken. (*b*) Female, Nakakharari (Lasbela State, Baluchistan); 15.xi.1937; Z.S.I. No. 1183/H5; 6 eye-stripes; E/F 2·03; 27 antennal segments.

(*c*), (*d*). *Phase gregaria.*—(*c*) Male, from swarm at Lahore (Punjab); *c.* ii.1890; Z.S.I. No. 6553/12; eye-stripes not clear; E/F 2·19; antennae damaged. (*d*) Female, from swarm in Baluchistan; before 1911; Z.S.I. No. 693/17; 6 eye-stripes; hind-legs, elytra and antennae damaged, but specimen with typical *gregaria* facies.

*l.*², *l.*³, basal portions of mesothoracic and metathoracic legs respectively; *ms.i.*, mesosternal interspace; *ms.l.*, mesosternal lobe; *mss.*, mesosternum; *mt.i.*, metasternal interspace; *mt.l.*, metasternal lobe; *mts.*, metasternum; *prs.*, "presternite" area of mesosternum.

An examination of a series of *solitaria* and *gregaria* phase specimens of the Desert Locust in the collection of the Zoological Survey of India revealed that the size and shape of the metasternal interspace (fig. 2, *mt.i*) exhibit a marked correlation with phase, especially in males, as briefly described below :—

Phase solitaria (fig. 2 *a*, *b*).—Sex for sex, the metasternal interspace is comparatively small and is sharply narrowed posteriorly (especially in males). Taking w as the broadest (anterior) width of the metasternal interspace, and n the narrowest width (fig. 1), $\frac{w}{n} = x$ which may be termed the index of the metasternal interspace or, briefly, the metasternal index. This index gives one an idea of the degree of narrowness of the posterior end of the metasternal interspace as compared with its anterior end, or, in other words, of the degree of inward slope of the lateral boundaries of the interspace. In phase *solitaria*, x = about 2·8 in males and about 1·5 in females.

Phase gregaria (fig. 2 *c*, *d*).—Sex for sex, the metasternal interspace is larger and much less narrowed posteriorly than in phase *solitaria*. The lateral boundaries of the interspace exhibit only a small degree of inward slope and run almost parallel to each other. The narrowing exhibits little or no sexual dimorphism; in both sexes, x = about 1·2.

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BOOK NOTICE.

A check list of British Insects. By G. S. KLOET and W. D. HINCKS. Pp. lix + 483. 8vo. Stockport (Kloet and Hincks), 1945.

IN the preface to this work, by Mr. N. D. Riley, it is stated that this " list of the known British insects will undoubtedly be a most useful tool of great service to serious students, be they amateur or professional," a statement with which no British entomologist is likely to disagree.

The book opens with a facsimile of the title-page of Forster's *Catalogue of British Insects* published in 1770 and described by the authors as " the earliest list of British Insects which we have seen." Forster's work may be the earliest catalogue of insects, but one should not forget the now rare book by the London doctor, Christopher Merrett, entitled " Pinax rerum naturalium britannicarum continens vegetabilia, animalia et fossilia, in hac insulâ repperta inchoatus " which appeared as early as 1666 and includes lists of insects.

The long introduction to the " Check List " makes interesting reading and includes much information not readily available elsewhere. It also gives some indication of the extraordinary persistence, particularly of Mr. Kloet, which alone has ensured the completion of the undertaking.

It is not possible to criticise the completeness of the list—but certainly a word should be said of the very clear presentation of the printed matter on the pages. The book is set in double column and a wise use of black-faced type and ample spacing do much indeed to help the reader. One wonders whether a successor to this book will appear during one's lifetime—judging by past experience the answer is certainly no !

Book Notice.

A monograph of the beetles associated with stored products. Vol. 1. By H. E. Hinton. Pp. viii + 443, 505 figs. 8vo. London (Trustees, British Museum (Natural History)), 1945. Price £1 1*s.*

"During a war . . . a large part of the productive resources of the nation are used for the prosecution of the war, and such labour or shipping as can be spared for the production and transportation of food and clothing is strictly limited, so that any damage caused through insect attack becomes a serious problem for the State." The above quotation is from the Introduction to this book and explains the causes which led to its preparation.

As the title states, this work deals with Coleoptera associated—usually as pests—with stored products and 175 species are fully described in the families Carabidae, Staphylinidae, Nitidulidae, Lathridiidae, Mycetophagidae, Colydiidae, Murmidiidae, Endomychidae, Erotylidae, Anthicidae, Cryptophagidae and Dermestidae.

In selecting species for inclusion in the book a series of 8 categories was compiled as follows :—

1. Species which consume stored products.
2. Species which feed on moulds or other fungi growing on stored products or places where they are kept.
3. Species which are predators or parasites.
4. Species which feed on dead or injured animals.
5. Species which feed on faeces.
6. Species which normally attack structures or packing cases.
7. Species which attack material out of doors and emerge while it is stored.
8. Stray species found near, or in, but unrelated to, stored products.

The work opens with a key to the families divided into adults and larvae and similar keys are provided to the families.

Full descriptions of the species are given and notes are appended drawing attention to the literature on control measures.

The list of references extends to 27 pages and the volume is completed by an index to names.

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> Smith, A., 1936, New species of Coccidae. *Proc. R. ent. Soc. Lond.* (B) **6** : 301–306, pl. 1.
>
> ——. 1936, New species of Coccidae. *Trans. R. ent. Soc. Lond.* **84** : 901–936.

Titles of periodicals cited are to be abbreviated in the manner indicated in the *World List of Scientific Periodicals, 2nd edition*, 1934.

Authors are entitled to receive 25 copies of their papers free of charge and may purchase additional copies provided that request be made before publication.

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Papers of less than eight printed pages (approximately 7000 words) will not normally be accepted for the *Transactions*, and papers by authors who are not Fellows of the Society must be communicated by a Fellow.

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TO BE HELD IN THE SOCIETY'S ROOMS

41, Queen's Gate, S.W.7

1946.

WEDNESDAY, March 20
„ April 3
„ May 1
„ June 5
„ October 2, 16
„ November 6, 20
„ December 4

1947.

WEDNESDAY, January 15 (ANNUAL MEETING)
„ February 5

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